

CHAPTER 4

MEMBER 4 PRIMATES

In the early years of excavation at Sterkfontein, Alun Hughes concentrated on cleaning fossils from Lime miners' dumps. This resulted in a large collection of primate cranial and postcranial material housed in Department of Anatomical Sciences at Wits. The cranial material identifiable to species was analyzed by Eisenhart (1974). However, the vast collection of postcranial and cranial fragments has not been analyzed, and this would comprise a thesis in itself or several theses. For this reason, and more so because the dump material may sample areas other than Member 4, hence increasing the uncertainty of their original context, this material has not been used for this study.

The hominid fossils from Member 4 have been subject to detailed study by numerous researchers and hence do not form part of the primary analysis in this thesis. However observations have been made on new hominid material identified during the course of analysis of faunal collection for this study.

4.a. Taxonomy

Two families of primates were identified from the recently excavated Member 4 fossil assemblage: hominid and cercopithecoid (non hominid). During the course of analysis of faunal collection excavated by Phillip Tobias and Alun Hughes, 12 hominid specimens were identified which had been misidentified or not recognized. For completeness, these have been described below. The newly identified hominids could only be assigned to the genus *Australopithecus*, but could not be identified to particular species. Similarly, the non-hominid primates were assigned to

Cercopithecidae. However, it was possible to divide the non-hominid primates to size classes: large, medium and small based on cranial and postcranial materials (Appendix I).

Systematic palaeontology

Family: Hominidae

♣ *Australopithecus* sp.

Material

S94-13094 (StW 610), left femur neck (Plate 4.1); S94-13093 (StW 611), left ischium (Plate 4.2); S94-12836 (StW 612), left scapula spine (Plate 4.3); S94-12132 (StW 613) right ulna olecranon (Plate 4.4); S94-12332 (StW 614), right distal femur shaft (Plate 4.5); S94-14519 (StW 615), femur shaft (Plate 4.6); S94-14529 (StW 616), left clavicle (Plate 4.7); S94-2126 (StW 617), distal phalanx (Plate 4.8); S94-9188 (StW 618), left scaphoid (Plate 4.9); S94-12062 (StW 522b), right femur neck (Plate 4.10); S94-2067 (StW 471), lower incisor (Plate 4.11); and StW 431 (Kibii & Clarke 2003).

Description

StW 610, left femur neck, extends from its junction with the head to just medial of the greater trochanter on its superior surface and just superior to the lesser trochanter on the infero-medial surface. The head and shaft were separated from the neck prior to fossilization as shown by adhering breccia to the broken cross-sections. The specimen is of similar size and shape to the femoral neck of *Australopithecus* femur StW 99. The surfaces show damage inflicted during preparation.

StW 611 is a well preserved left ischium specimen, extending from the center of the acetabulum to the superior border of the ischial tuberosity. The broken edges are rugged and consistent with indications of carnivore breakage, shown by small

punctuate tooth marks. The specimen is larger than Sts 14 from Sterkfontein and comparable in size to *Paranthropus* SK 50 from Swartkrans.

StW 612 is a left scapula spine that extends from the junction with the supraspinatus and infraspinatus fossa to the angular junction with the acromion, where it is broken through and the acromion is missing. The broken edges are patinated showing they are old breaks but there are also recent breaks resulting from excavation damage. The specimen is similar in size to a small modern human.

StW 613 is a well preserved right ulna olecranon that extends from the superior surface to the broken through base of the trochlear notch just above the position of the radial notch. The specimen is of similar size to StW 398 left ulna but of different shape and not the same individual.

StW 614 is an approximately 60mm long right femur shaft broken just above the adductor tubercle. The specimen has heavy carnivore gnawing on the broken surface and carnivore gnawing on the surface of the superior break. The shaft is platymeric and approximately of the same size as StW 448.

StW 615 is a midshaft section of femur, side indeterminate, approximately 70mm long, with fresh breaks at both ends. The midshaft is slightly platymeric compared to modern humans and is approximately the same size as StW 448.

StW 616 is an approximately 25mm long section of left clavicle towards the acromial end. The specimen has fresh breaks laterally and ancient breaks medially.

StW 617 is a perfectly preserved distal phalanx of the thumb. The specimen is similar in shape to the thumb phalanx of StW 573 from Sterkfontein Member 2 (Clarke pers. comm.). The specimen is 16mm long and 13.7mm wide at the base. Thus it is shorter relative to its breadth and differs markedly from that of humans and

also apes in this respect. The specimen bears strong prominences on the palmar surface for muscle attachments.

StW 618 is a perfectly preserved left scaphoid, lacking only the very tip of the tubercle. It differs from the modern humans and more resembles the apes in the form of the tubercle, which is relatively more slender.

StW 522b, though damaged is a mirror image of the left femur StW 522a. Both have the same dimensions and morphology, and of particular note is the fact that both femora exhibit a groove running from the middle of the posterior surface of the neck, into the position where the intertrochanteric crest fossa would have been had it not been broken away. The groove seems to have been for the tendon of the obturator externus muscle. Just inferior to the medial end of this groove, is a wide foramen in both StW 522a and b.

StW 471 is a poorly preserved lower incisor, with heavy occlusal wear. It belongs with earlier discovered poorly preserved mandible fragments of StW 471.

StW 431 is an upper half of the left ilium, belonging to the Sterkfontein *Australopithecus* pelvis StW 431. Description of the specimen has already been published (Kibii & Clarke 2003).

Skeletal Part Representation and Minimum Number of Individuals

A total of 1102 primate specimens have been recovered and analysed from Member 4. Of these, 872 (79%) are cranial elements while the rest are postcranial. Fourteen non-hominid primate individuals were identified from the recently excavated materials used for this study. Ten specimens represented four large size adult individuals. Their MNI was derived from six ulnae specimens (Appendix I). Visual comparison indicated that these specimens could have derived from at least

four individuals. Ninety-nine specimens represent four medium size adult individuals. Their MNI was derived from visual comparison of ten femora specimens, which indicated they derived from at least four individuals. Skeletal part representation indicates that the femur and ulna have the highest representation in terms of NISP, MNE, MNI cMAU and %MAU (Table 4.2). Six small size individuals were recovered in this study. Four of these individuals are adults, identified from seventy-four cranial and postcranial specimens, while the other two are juveniles, identified from five postcranial specimens. The MNI for the small size non-hominid primate adults was derived from five radii specimens, while the MNI of the two juveniles was derived from three femora (Appendix I). Skeletal part representation indicates that the tibia is the most represented in terms of %MAU (Table 4.3).

Ten specimens were identified as belonging to hominid. The specimens could not however be assigned to a species, but could only be identified as belonging to the genus *Australopithecus*. Though the specimens derive from different regions of the body, and thus could theoretically have been from a single individual, this is not likely as they come from widely separated areas (Appendix I). Thus the MNI of hominids, based on the new data could theoretically be one, but if considered in context of all the hominid specimens from Member 4, they are undoubtedly from several different individuals.

In the light of the new data, and previous studies by Brain (1981), Pickering (1999) and Pickering *et al.* (2004a), at least six species of primates have been recovered from Sterkfontein Member 4 assemblage. These include *Australopithecus africanus*, *Parapapio broomi*, *Parapapio jonesi*, *Papio izodi*, *Parapapio whitei*, and *Cercopithecoides williamsi*. Also contributing to the assemblage are the individuals of

indeterminate *Parapapio* species, *Australopithecus* sp., and taxonomically indeterminate cercopithecoid.

From the previous studies and this study, both the hominid and non-hominid primates account for three hundred and eighty-five individuals, which translates to 75% of the total number of individuals of all macrofauna recovered from Member 4 assemblage.

Hominids

Eighty-seven individuals belonging to *Australopithecus* have been identified from Member 4 assemblage (Brain 1981; Pickering 1999; Pickering *et al.* 2004b). The hominids account for 17% of the total cMNI recovered from Member 4. Initially, researchers thought that all the hominid specimens derived from *Australopithecus africanus*. However, further research on the fossil hominid specimens revealed that there are at least two hominid species represented (see Clarke 1988a, 1988b, 1990, 1994b; Pickering 1999).

Non-hominid primates

Five species of the family Cercopithecidae are represented in the Member 4 assemblage. Twenty-seven individuals belonging to *Parapapio jonesi* were identified from thirty-five cranial and two postcranial specimens (Brain 1981). Most of the individuals were adults (Brain 1981: Table 79). The females from this species account for 59.3% of individuals identified (Brain 1981). Ninety-one individuals, identified from a hundred cranial specimens, represent *Parapapio broomi*. As with *Parapapio jonesi*, the adults are the most represented age category, accounting for 42.9%. The females have the highest representation, accounting for 47.3% of all identified *Parapapio broomi* individuals (Brain 1981). Ten individuals represented *Parapapio whitei*, identified from thirteen cranials and one postcranial specimen. The adults from

this species account for 50% of the individuals, and there is equal representation between males and females. Seventeen individuals, identified from twenty cranials and one postcranial, represent the large colobus monkey, *Cercopithecoides williamsi*. The adults of this species account for 58.8%, with the males accounting for 29.4% (Brain 1981).

Fifty-three individuals were assigned to *Parapapio* sp. indet, identified from two hundred and one cranial elements and five postcranial specimens (Brain 1981). With the addition of the new materials from the more recent excavations of Member 4, a hundred individuals that could not be identified at the generic or species level were identified from four hundred and twenty nine cranial and two hundred and five postcranial specimens. However, even with the addition of the new materials, the minimum number of individuals remained as had been aggregated by Brain (1981). Thus a total minimum number of two hundred and ninety-eight non-hominid primate individuals are accounted for in Member 4. This accounts for 58% of the total cMNI of all macrofauna from Member 4.

The table below depicts individuals in various age categories represented in each species (Data derived from Brain 1981).

Table 4.1. Non-hominid primate species' age classes from Member 4 infill.

| Age Class | <i>Parapapio jonesi</i> | <i>Parapapio broomi</i> | <i>Parapapio whitei</i> | <i>Cercopithecoides williamsi</i> |
|-------------------|-------------------------|-------------------------|-------------------------|-----------------------------------|
| Juvenile | 2 | 3 | 0 | 2 |
| Immature adult | 2 | 10 | 1 | 1 |
| Young adult | 7 | 20 | 2 | 3 |
| Adult | 12 | 39 | 5 | 10 |

| | | | | |
|--------------|-----------|-----------|-----------|-----------|
| Old adult | 4 | 19 | 2 | 1 |
| Total | 27 | 91 | 10 | 17 |

4.b. Taphonomy

Bone Surface Modification

Only three of the primate specimens examined for this study displayed signs of modification. A hominid femur shaft, StW 614, and a left tibia shaft (S94-13088) belonging to a medium size non-hominid primate, display definite carnivore tooth marks while a right scapula (S94-14235), derived from a medium size non-hominid primate displays definite small rodent gnawing.

As with the bovids in the previous chapter, the taphonomy of primates in Member 4 can only be considered with the incorporation of all primate specimens that have been recovered from this infill. The discussion below will thus include the new data plus that which had been previously analyzed by Brain (1981).

Assemblage formation

In their investigation of intrinsic qualities that affect primate bone survivorship from medium carnivore (leopard and spotted hyaena) ravaging, Carlson & Pickering (2003:440) discovered that “the longer a skeletal element in a ravaged primate carcass, the more likely it is to be represented in the refuse assemblage, while the shorter an element, the more likely it is to be represented in the scat assemblage”. This implies that bones of the hands and feet (phalanges, metapodials, carpals, and tarsals) are likely to be found within the scat assemblage as they are consumed during the initial stages, and usually swallowed whole (Marean 1991; Pickering 2001a,b).

Pickering (2001a,b) argued that the presence of these shorter skeletal elements might indicate that voiding carnivores were at least partially involved in the accumulation of a primate assemblage. Pickering also indicated that these elements rarely possess carnivore-related modification, such as tooth marks and stomach acid corrosion. The absence of such modification is attributed to the swallowing of the carpals/tarsal mass as a whole unit, and the protection of the unit from the acid by the surrounding skin. Carlson and Pickering (2003) also noted that there was a major difference between hyaenas and leopards in ingested bones. According to the two researchers, leopards ingested bones incidentally while consuming overlying meat, while the hyaenas intentionally consumed the bones. Pickering also observed that a hyaena's scat assemblage contains more unidentifiable bones compared to an assemblage resulting from regurgitations.

A characteristic feature of a refuse assemblage after leopard and/or cheetah ravaging on primate carcass is the comparatively intact skull (e.g. Wilson & Child 1966; Brain 1981). The brown hyaena will leave fragments of the skull but not intact skulls (Brain 1981). There is a high representation of primate crania in Member 4. Of the total non-hominid primates' specimens analysed by Brain (1981) and this study, 79% derive from the cranium while the other 21% are postcranials. However, there is equally a huge collection of postcranial material that derived from the miners dump and which has not been included for reasons stated earlier. In addition, Clarke (pers. comm.) is currently excavating an area in Member 4 that is yielding postcranial materials. Thus the interpretation given here is an attempt at explaining the taphonomic factors leading to the accumulation of the high number of individuals already identified.

The high representation of primates in Member 4 (60% of tMNI) is much higher than in the already analysed primate materials in other infills in Sterkfontein and in other sites within the Sterkfontein Cave System (e.g., Brain 1981, 1993; Pickering 1999). Brain (1981) investigated two hypotheses regarding the most likely scenario that resulted in the accumulation of primate remains in Member 4. The first hypothesis focused on the presence of a specialized predator of primates. Brain reasoned that the *Dinofelis* could have been the most probable candidate to specialize in preying on the primates. Brain also argued that the *Dinofelis* possessed “robust jaws and a well-developed crushing component in the dentition [that] would have allowed [it] to eat all parts of a primate skeleton except the skull” (Brain 1981:271). The second hypothesis was that large carnivores preyed on the primates when they (primates) came to their sleeping quarters. These two hypotheses are investigated further, in the light of the new information and from the aspects below:

- Primate body size, age, and habits
- Predator presence and predator hunting range.

Primate body size, age, and habits

Primate body size is a crucial factor in determining its vulnerability to predation. The reactions of primates towards predators depend, in part, on their body sizes relative to those of their predators (Cheney & Wrangham 1987). The two researchers indicated that instances of predation are inclined to be less recurrent as body size increases among the smaller primates. Their research was improved by inclusion of mean group size (Clutton-Brock & Harvey 1977). Clutton-Brock and Harvey’s research revealed that body size and (log) group size are just as good determinants of predation rate. The logic that follows is that large bodied primates are

likely to be preyed on by fewer predators than smaller bodied primates. Large groups of primates on the other hand are effective in warding off predators, due to their group size which offers more intimidation to a would be predator. However, all primate species have been known to adopt a wide range of alarm calls and co-operative defensive systems when faced with potential danger of predation (e.g., Seyfarth et al., 1980). For example, “small primates can conceal themselves; larger primates may mob predators, with or without physical contact” (Isbell 1994:61).

Sleeping habits of primate species could also be a factor in determining whether the primates are inherently vulnerable to predation. With the exception of *Gorilla gorilla*, all other primates sleep off the ground in nests, holes, or trees, or on cliffs” (Isbell 1994). Primates are also known to exploit caves and sinkholes as resting and sleeping quarters (e.g., Coryndon 1964; Simons 1966; Gow 1973; Brain 1981). Brain (1981) revealed that baboons are scared of darkness and will not venture out of their hide out or sleeping quarters into the darkness. Leopards have been observed to take advantage of such sites where they prey on the primates, e.g., Mount Suswa in Kenya (Simons 1966). Research also indicates that savannah leopard predominantly travels and hunts at night (e.g., Bailey 1993). This implies that savannah primates would be more vulnerable to attack by leopards, in their sleeping quarters, during the night than in open environment when they are feeding. Primates also exploit large canopy trees as sleeping quarters. The prevailing dense foliage provides cats, such as leopards, with hiding zones where they stalk and take their prey (e.g., Zuberbühler & Jenny 2002). Environmental reconstruction during Member 4 times indicates that there was a forest fringe environment, equivalent to that in tropical forests of Congo at the cave’s opening and/or within the vicinity of the cave’s opening (Bamford 1999). The large tree canopy and dense foliage would be an ideal hiding for closed

habitat predators such as *Dinofelis* and leopards, from where they could pounce on their victims. If such sites are used frequently, it is possible that primate skeletal parts will be accumulated, as a refuse assemblage from the cats.

In a research conducted by Isbell *et al.*, (1990), on vervet monkeys, the researchers identified four scenarios which could have made the vervet monkeys more vulnerable to attacks by predators in a new or unfamiliar territory. The “individuals may have been preoccupied with exploring their environment rather than with scanning for predators”; “they may have been more active and thus more conspicuous to predators”; “they may have been less knowledgeable about refuges and escape routes”; and “they may have been unfamiliar with the hunting and ranging behavior of individual predators” (Isbell *et al.*, 1990: 356). The third reason was thought to have been the most plausible on the increased vulnerability of the vervet monkeys. The researchers also discovered that when the vervet monkeys moved into new areas, there was increased predation and more so on mature females and immature. If this scenario is accessed in relation to observed sex frequencies of primates in Member 4, it is apparent that there is more representation of females than males. Where males are represented, the majority of the individuals are between young adult and old adult, with few juveniles and immature adults (Brain 1981: Tables 79-82). The discrepancy on the representation of females and males can be considered in reference to primate home range and resource exploitation. Primate species occupy a specific home range that they aggressively defend from other primates. The primates exploit the resources within and only move to new areas when the resources are scarce in their environment. However, males disperse to new home ranges when they attain sexual maturity (Isbell *et al.*, 1990.). It is during such migration and settling in unfamiliar new territory that the primates could have been easily preyed upon by the predators.

Thus a higher representation of young adult males may indicate predation as they dispersed and settled into new territory. Though dispersing to new home ranges, the young adult males would present a formidable defence against predators such as leopards, more effectively than migrating females, especially with young ones and old adult males accompanying the females. This would imply that in the case of a predator specializing on preying on primates on their migration route, a higher number of skeletal elements belonging to mature females, old adult males and juveniles may be expected. However, where postdepositional processes have deleted the more fragile skeletal elements, then a bias towards higher representation of skeletal elements belonging to adults is likely. Thus it is likely that the high representation of primates in Member 4, and more so the higher representation of females, resulted, in part, from the action of carnivores that capitalized on preying on primate individuals either during dispersal and settlement into new and unfamiliar territory or selectively on females as they are less able to defend themselves especially if they have an infant to slow them down.

This opinion can also be supported by a closer look at the size classes and species of primates represented. Medium size individuals dominate the representation of primates from Member 4. This size class falls within the prey size range of the majority of the carnivores represented in Member 4. Five species of non-hominid primates were identified within the Member 4 primate assemblage. Considering the territoriality of primate species, there is a high probability that these species would not have co-existed at Sterkfontein at the same time. Although the fossils may have been accumulated over a long period of time, it would imply that the region neighbouring the site was occupied by various species of primates on different occasions or the

predators involved exploited wide hunting ranges and transported the bodies to the site. These views are investigated further below.

Predator presence and predator hunting range

Primates are at risk from a wide range of predators, including carnivores, reptiles, raptors and even other primates. Episodic predation of primates by lions, hyaenas, cheetahs, wild dogs, and leopards has been documented in various places (e.g., Kruuk & Turner 1967; Schaller 1972; Busse 1980; Boesch 1991; Isbell & Young 1993; Condit & Smith 1994; Isbell 1994). This episodic predation has been attributed to the hunting range of individual predators. Most of the terrestrial predators have hunting ranges that are several times larger than the home range of any of the primate groups (e.g., Kruuk & Turner 1967; Boesch 1991; Isbell 1994). Among terrestrial carnivores, leopards are the most formidable predators of primates, and primates account for a substantial amount of their diet. As much as 10% of their diet, at times, has been known to be primates (Mills & Biggs 1993). In other instances, up to 24% of their scat assemblage has been identified to be primate (Hoppe-Dominik 1984). Though leopards prey on a variety of different animals, individual prey preferences have been observed where some leopards may hunt baboons almost exclusively (e.g., Stoltz 1977). Since the behaviour of extinct Plio-Pleistocene predators can never be known, it can only be inferred from modern close analogs. For example, lion and leopard are the best analogs for large extinct felids, such as *Dinofelis*. Actualistic experiments on carnivores, such as cheetah and leopard, ravaging on primates indicate that though a range of skeletal parts survive, the cranium is usually minimally destroyed or left intact (e.g. Brain 1981; Pickering 2001a,b). Intact postcranial bones are also recovered during such feeding incidences depending on the factors such as

the number of carnivores involved, competition and intensity of hunger. Though there is a paucity of carnivore related modification, in the Member 4 primate assemblage, this is not inconsistent with expected frequencies, as the majority of modifications in modern assemblages are observed on the postcranials.

Research has also recognised primates to account for as much as 87% of crowned eagles' prey (Skorupa 1989; Struhsaker & Leakey 1990). The eagles were seen to exploit areas with extensive amount of tree cover. Contrary to popular belief that terrestrial primates are at more risk of predation, researchers discovered that arboreal primates are more preyed upon since carnivores, especially the leopard take advantage of the tree cover as hideouts (Kruuk 1986; Sunkuist & Sunkuist 1989). Eagles prey on various mammals, including antelopes weighing up to about 30kg (Steyn 1982; Tarboton & Allan 1984; Ginn *et al.*, 1989). The favoured primate preys of crowned eagles include vervet, colobus monkeys and young chacma baboons (Seyfarth *et al.*, 1980; Steyn 1982; Tarboton & Allan 1984; Ginn *et al.*, 1989). Eagles however prey more on the small primates such as vervet monkeys and are not much of a threat to larger sized monkeys such the baboons. Though not unlikely, the absence of eagle modification, in addition to the high number of larger-size primates within the Member 4 primate assemblage, argues against the raptors having contributed to the accumulation of the assemblage.

Chimpanzees are known to prey on small baboons (Goodall 1968; Wrangham 1975) and colobus monkeys (Busse 1977; Plummer & Stanford 2000). Busse (1977) documented 75% of predatory attacks in 85 chimpanzee-colobus monkeys' encounters. Of the 75% attacks, 48% resulted in colobus monkeys being killed by chimpanzees. Busse reported that adult male colobus monkeys were less prone to attacks by the chimpanzees but males and females from all the other age groups were

prone to attack by the chimpanzees. Plummer and Stanford on the other hand documented that hunting by chimpanzees is chiefly done by the males, accounting for more than 90% of the kills. The chimpanzees exploit large canopy trees as their hunting ground. The two researchers noted that consumption of prey can take place either on the ground or high up in trees. These predation 'core areas' may be utilized for extended duration of time, sometimes as much as three years (Stanford 1996), and may accumulate caches of refuse skeletal elements (Plummer and Stanford 2000). Plummer and Stanford indicated that assemblages formed by chimpanzees were characterized by dominance of small taxa, high proportion of immature individuals, limited taxonomic diversity and high frequency of skull bones. The researchers reasoned that a similar model would have characterized "hominids lacking a lithic technology" (Plummer and Stanford 2000:360). The focus on immature individuals I presume is aimed at avoiding dangerous confrontations with mature individuals who are likely to put up a fight in defence. Though the Member 4 primate assemblage is characterized by high frequencies of skull bones, it departs in a crucial aspect from the chimpanzee refuse assemblage model in the high frequencies of mature individuals in relation to the immature in the former. This representation argues against the chimpanzee-sized primates in the form hominids being the agents responsible for the accumulation of primates within the Member 4 fossil assemblage.

A final consideration that could have accounted for the high proportion of primate individuals within Member 4 is "death trap". Death trap in this sense comprises those that fall to their death and individuals dying naturally within the cave where they seek abode. A good indicator of death trap situations is complete skeletons and presence of antimeric pairs of skeletal elements. Though the collapse within Member 4 and the subsequent blasting by lime miners would have disturbed the

context of skeletal elements, the recovery of skeletal elements from all regions of the body strongly indicates that a whole body was present. Thus the recovery of numerous cranial elements and numerous postcranial elements would indicate that the cave was utilised by primates as a sleeping den, and the possibility exists that the primates may also have fallen to their death into the cave. This second scenario is hereby regarded as more plausible an explanation in the accumulation of part of the primate assemblage.

In conclusion, from the available indications in the form of primate size class and age, skeletal part representation and observed carnivore modification, it is reasonable to conclude that the accumulation of the non-hominid primates within the Member 4 fossil assemblage was a factor of carnivores and natural death within the cave. This is in part consistent with Pickering *et al.* (2004a) conclusion that large carnivores may have been responsible for the accumulation of some of the hominids in Member 4. This conclusion was drawn from a combination of carnivore tooth marks and skeletal patterning similar to that which has been documented in various actualistic-feeding experiments of carnivores ravaging primate carcasses (Pickering 2001a,b; Carlson & Pickering 2003). It is possible, though still an assumption at the moment, that most of the predation was on migrating species of primates, which would account for the high frequency of female individuals. More research is needed to shed light on predation of migrating primates by various predators. However other processes, or even other primates, may also have contributed to the accumulation of this assemblage.